REMARKS

Upon entry of this Response, claims 1-25 are pending. By way of this Response, claims 1, 6, 8 and 11 are amended, and claims 18-25 are added. The Director is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090.

Rejections Under 35 U.S.C. § 101

Claims 6-17 stand rejected under 35 U.S.C. § 101 as allegedly being nonstatutory process claims.

Applicants refer to a memorandum dated January 7, 2009, issued by John J. Love, Deputy Commissioner for Patent Examination Policy, titled "Guidance for Examining Process Claims in view of *In re Bilski*," which states in part:

> As clarified in the *Bilski* decision, the test for a method claim is whether the claimed method is (1) tied to a particular machine or apparatus, or (2) transforms a particular article to a different state or things. This is called the "**machine-or-transformation test**."

Applicants respectfully submit that amended independent claims 6 and 11 are tied to a particular machine.

In particular, claim 6 recites, *inter alia*, "storing the shifted samples of the beginning of the symbol in a buffer." Storing the shifted samples in a buffer is not an insignificant extra-solution activity. By storing the shifted samples in a buffer, Applicants are able to "copy[] the stored samples at the end of the symbol."

Claim 11 recites, *inter alia*, "transforming the symbol to a time domain by using an inverse Fourier transform circuit to perform an inverse Fourier transform on the phase-shifted complex coefficients to produce a set of samples as the symbol in the time domain." The "inverse Fourier transform circuit" is a particular machine, and the transformation from frequency-domain to time-domain is not an insignificant extra-solution activity.

Newly added claim 19 is a method of operating a discrete multitone (DMT) modulation transmitter, and claim 19 recites, *inter alia*, "providing the phase shifted set of

frequency-domain complex coefficients to an inverse Fourier transform circuit; [and] generating a set of time-domain samples by the inverse Fourier transform circuit performing an inverse Fourier transform on the phase shifted set of frequency-domain complex coefficients." The "discrete multitone (DMT) modulation transmitter" and the "inverse Fourier transform circuit" are particular machines, and the transformation from frequency-domain to time-domain is not an insignificant extra-solution activity.

For at least the reasons provided above, Applicants respectfully submit that claims 6, 11 and 19, and their respective dependent claims, are directed to statutory subject matter. Applicants respectfully request that the aforementioned rejection be withdrawn.

Rejections Under 35 U.S.C. § 103

Claims 1-5 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over "applicant's admitted prior art" (AAPA) in view of U.S. Patent No. 5,506,836 to Ikeda et al. (hereinafter "Ikeda"). Applicants respectfully traverse the rejection and request reconsideration.

Claim 1 is nonobvious over the AAPA in view of Ikeda. In particular, Ikeda does not teach or suggest the features of claim 1 that are missing from the AAPA. The Examiner points to column 7, lines 15-53, of Ikeda for allegedly disclosing shifting the phase of each complex coefficient by a value proportional to its frequency.

Ikeda does not disclose shifting the phase of each complex coefficient by a value proportional to its frequency. Starting at column 5, line 30 through column 10, line 11, Ikeda discusses the basic principle of orthogonal frequency division multiplex (OFDM). ("Before explaining the preferred embodiments of the OFDM demodulation apparatus of the present invention, an explanation will be given of the basic principle of OFDM modulation in the present invention using numerical equations ." Column 5, lines 25-29.) At column 7, lines 12-13, Ikeda specifically states "The explanation will be made of the case where there is no guard interval, i.e., the case where T=T'." At column 7, lines 66-67, Ikeda specifically states "An explanation will be made of the case of presence of a guard interval." The portion of Ikeda cited by the

Examiner is merely a description of the basic principle behind OFDM for the case of no guard interval, i.e., the case where there is no prefix to a symbol.

In particular, Ikeda explains in column 7, lines 10 to 55 the mathematical relationship between a phase variation in a complex coefficient and a time shift in the time domain. Ikeda fails to suggest introducing a phase shift of the complex coefficients before performing an inverse Fourier transformation (IDFT) on the phase shifted coefficients.

Applicants' shift the phase of each complex coefficient by a value proportional to its frequency must before the complex coefficients are transformed by an inverse Fourier transform from complex coefficients (i.e., frequency domain) to samples (i.e., time-domain). Ikeda does not disclose phase shifting complex coefficients (i.e., frequency-domain numbers) before transforming the complex coefficients (i.e., frequency-domain values) into samples (i.e., time-domain values). In particular, in column 11, lines 45 to 47, Ikeda refers to the use of "buffer memories 808 and 809 perform[ing] processing such as adding guard intervals". These buffer memories are after the IDFT circuit, hence in the time domain, which corresponds to Applicants' Figure 2 disclosing prior art. This sentence of Ikeda demonstrates that no phase shift is introduced before the inverse Fourier transform (IDFT) circuit 805. If there were a phase shift of the complex coefficients, then the guard intervals would come directly from the IDFT as disclosed by Applicants and the buffer memories would provide the samples corresponding to the end of the symbol (see Fig. 4 of the present application) and not to the guard interval.

Applicants have amended independent claims 1, 6 and 11 to clarify that the phase shift of the complex coefficient occurs before the complex coefficients are transformed, via an inverse Fourier transformation, into the time-domain samples. In particular, independent claim 1 recites, *inter alia*, "means for generating the sequence of samples in time domain of the symbol *via an inverse Fourier transform on the shifted complex coefficients*;" independent claim 6 recites, *inter alia*, "*performing an inverse Fourier transform on the shifted complex coefficients* to generate the samples of the symbol in time domain;" and independent claim 11 recites, *inter alia*, "transforming the symbol to a time domain by using an inverse Fourier transform circuit to *perform an inverse Fourier transform on the phase-shifted complex coefficients* to produce a set

of samples as the symbol in the time domain." (Emphasis added.) In each one of the independent claims, the inverse Fourier transformation is done on the phase shifted complex coefficients, and consequently, the phase shifting of the complex coefficients occurs prior to doing the inverse Fourier transformation. As described above, Ikeda fails to disclose first shifting the phase of complex coefficients and then doing an inverse Fourier transformation on the shifted complex coefficients.

In addition, Applicants have disclosed improvements to prior art discrete multitone modulation (DMT) circuits. One embodiment is directed toward circuit 20 (see Figure 4) which includes a FIFO memory 24. One advantage of the circuit 20 is that the transmission of a symbol with a prefix may be delayed by only the duration of the prefix. Whereas, in prior art circuits the transmission of a symbol with a prefix is delayed by the duration of the symbol. Another advantage of the circuit 20 is that the FIFO memory 24 need only store the number of samples that make up the prefix. Whereas, in prior art circuits a memory stores all of the samples that make up the symbol.

Applicants respectfully submit that the non-obviousness of shifting the phase of each complex coefficient by a value proportional to its frequency is demonstratable by the age of Ikeda. Even though Ikeda does not disclose shifting the phase of each complex coefficient by a value proportional to its frequency, Ikeda is useful for demonstrating the state of the art on January 21, 1993, the filing date of Ikeda in Japan. Applicants filed in France on January 27, 1999. There is almost a six year difference between the filing dates, and in the fast changing world of modern communications, six years is a long time. Applicants respectfully submit that given the advantages that are achieved by shifting the phase of each complex coefficient by a value proportional to its frequency then, if it were obvious to do it, someone would have done so during the almost six intervening years between Ikeda's filing date and Applicants' filing date. In other words, the fact that no one recognized the advantages that are achieved by shifting the phase of each complex coefficient by a value proportional to its frequency shows it was not obviousness to one of skill in the art.

All of the claims remaining in the application are now clearly allowable. Favorable consideration and a Notice of Allowance are earnestly solicited.

Respectfully submitted,

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